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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Mathew T. Abraham

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EXAMINER

SELLERS, DANIEL R

ART UNIT

PAPER NUMBER

2615

DATE MAILED: 06/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/786,697	ABRAHAM, MATHEW T.	
	Examiner	Art Unit	
	Daniel R. Sellers	2615	

-- **Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --**
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Miller and Prinssen, USPN 5,119,428.

4. Regarding claim 1, Miller teaches a first channel element and a second channel element with a communication pathway in a multi-channel acoustic system (Col. 7, lines 9-19, lines 33-36, lines 42-47, and lines 52-57 and Fig. 5, units 20a, 20b, 40a, and 40b). However, Miller does not teach two microphones with associated acoustic sources on one performance stage.

Prinssen teaches an electro-acoustic system for use in theaters, wherein a plurality of microphones are placed on a stage along with associated acoustic sources (Col. 1, lines 22-59, Col. 2, lines 15-33, Col. 16, line 57 - Col. 17, line 2, and Fig. 1, 8a and 8b). Prinssen also teaches active equalization to limit acoustic feedback (Col. 9, lines 29-58), wherein it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Miller and Prinssen for the purpose of limiting acoustic feedback in a multi-channel system. Miller teaches synchronization

and arbitration of the response analysis between the channels (Col. 7, lines 42-57), where one of ordinary skill in the art recognizes the advantage of a faster response when the analysis is synchronized and arbitrated.

5. Regarding claim 2, the further limitation of claim 1, see the above arguments.

6. Miller and Prinssen teach a feedback suppression system for one channel, and further teaches that the same system can be used for a plurality of channels. Therefore the first and the second elements are functionally identical.

7. Regarding claim 3, the further limitation of claim 1, see the above arguments with respect to claim 1. The combination teaches the acoustic system of claim 1, and further teaches the use of digital signal processing techniques for creating the notch filter (Miller, Col. 5, lines 63-67). Miller also teaches that the multiband gain control unit is **any device** that can be automatically controlled to vary the gain of a selected audio band, and Miller teaches in one embodiment that the bands are $\frac{1}{2}$ to 1 octave wide spaced $\frac{1}{3}$ an octave apart (Col. 4, lines 21-46). These widths cover 6 to 12 semitones and are spaced every 4 semitones in a western musical scale, and typical notch filters are usually a few to several semitones wide. The fact that Miller teaches that the multiband control unit can be any device that would have these desirable features, it is inherent that the multiband control unit can be 31 notch filters, which would be automatically controlled.

8. Regarding claim 4, the further limitation of claim 3, see the above arguments of claims 1, 2, and 3. The combination teaches a system with functionally identical feedback suppression elements. The second element has all the functionality of the

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first element, therefore the combination teaches a second channel element with these features.

9. Regarding claim 5, the further limitation of claim 4, see the above arguments with respect to claim 4. The combination teaches a communication system which passes parameters between the elements.

10. Regarding claim 6, the further limitation of claim 1, see the above arguments with respect to claim 5. The combination teaches the separate elements working synchronously, and therefore one element passes parameters to the other through the communication means.

11. Regarding claim 7, the further limitation of claim 1, see claim 1. The combination teaches a multi-channel feedback suppression system.

12. Regarding claim 8, the further limitation of claim 4, see the above rejection of claims 1 and 4. The combination teaches a multi-channel feedback suppression system.

13. Regarding claim 9, the further limitation of claim 8, see the above rejection of claims 8. The combination teaches a plurality of channel elements and teaches a communication pathway linking the plurality of channel elements (Miller, Col. 7, lines 52-57).

14. Regarding claim 10, the further limitation of claim 8, see the above rejection of claim 8. The combination teaches that the different elements both choose to communicate with each other or choose not to communicate with each other (Miller, Col. 7, lines 42-47).

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15. Regarding claim 11, the further limitation of claim 3, see the above rejection of claim 3. The combination teaches a control module (Miller, Col. 7, lines 20-24).

16. Claims 12-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Miller and Prinssen as applied to claims 1-11 above, and further in view of Jaeger.

17. Regarding claim 12, see the above argument with respect to claim 1. The combination of Miller and Prinssen teaches an automatic equalizer, wherein the first and second performance microphones and associated acoustic sources are found on a stage. Miller teaches the steps of detecting feedback, determining filter parameters and adjusting the element to ameliorate the feedback. However, Miller does not explicitly state that an indicator is sent through the communication channel, but it is obvious that an indicator must be sent for the step of arbitration or synchronization (Col. 7, lines 55-57). Miller also does not teach that any filter parameters are sent to the second element. Jaeger teaches a signal enhancement system for audio signals. Jaeger does not teach a feedback suppression system. Jaeger teaches identical expander circuitry in both channels and a system, which provides the same amount of gain to expander circuits in both the left and right channels of a stereo signal. The amount of gain is shared across the channels in its respective frequency band to preserve the stereo image (Col. 9, lines 53-58). It would have been obvious for one of ordinary skill in the art to combine the teachings of Miller and Prinssen with those of Jaeger for the purpose

of high fidelity. The coefficients of an adaptive filter in one channel should be used in the other channel to preserve the stereo image.

18. Regarding claim 13, the further limitation of claim 12, see the preceding argument regarding claim 12. The combination of Miller, Prinssen, and Jaeger teach this.

19. Regarding claim 14, the further limitation of claim 13, see the preceding arguments of claims 2 and 13. Miller teaches a plurality of channels with identical feedback suppression means, and the combination of Miller, Prinssen, and Jaeger teach the features of claim 13.

20. Regarding claim 15, the further limitation of claim 14, see the above argument with respect to claim 12. The combination of Miller, Prinssen, and Jaeger teach the sending of an indicator.

21. Regarding claim 16, the further limitation of claim 14, see the above argument with respect to claim 12. The combination of Miller, Prinssen, and Jaeger teach the sending of filter parameters to preserve the stereo image.

22. Regarding claim 17, the further limitation of claim 14, see the preceding arguments with respect to claim 15 and 16. The combination teaches these features.

23. Regarding claim 18, the further limitation of claim 12, see the preceding argument of claim 12. Miller teaches a feedback suppression system, which selects frequency and depth (Col. 4, lines 32-40).

24. Regarding claim 19, the further limitation of claim 18, see the preceding argument with respect to claims 12 and 18. Miller teaches the use of a DSP to

implement filters. It would be obvious to program the DSP to increment the depth variable to ameliorate feedback. In the art of adaptive filters, coefficients are adaptively adjusted in increments with reference to an error or distortion signal.

25. Regarding claim 20, the further limitation of claim 19, see the preceding argument with respect to claim 19. In the art of adaptive filters, the coefficients are adjusted until a predetermined result is obtained.

26. Regarding claim 21, the further limitation of claim 19, see the preceding argument with respect to claim 20. Miller teaches a feedback suppression system, so it is inherent that the depth of a notch filter is increased until the feedback is suppressed.

27. Regarding claim 22, the further limitation of claim 12, see the preceding argument with respect to claim 12. Miller teaches an automatic equalizer, which creates a reference signal to be played back through the system for the purpose of calibration. Miller further teaches that the incoming signal, mixed with the reference signal, is monitored in an appropriate time window to determine if the reference signal caused any acoustic feedback. Miller teaches that the system takes corrective action when acoustic feedback is detected (Col. 6, lines 51-61).

28. Regarding claim 23, the further limitation of claim 12, Miller teaches a system using a DSP. The DSP is a processor, and inherently has its instructions stored on a computer-readable medium.

29. Regarding claim 24, the further limitation of claim 13, Miller teaches a system using a DSP.

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30. Regarding claim 25, the further limitation of claim 13, Miller teaches a system using a DSP.

31. Regarding new claim 26, see the preceding argument with respect to claims 1 and 12. The combination of Miller, Prinssen, and Jaeger teaches the features of adaptive notch filtering in two different feedback paths.

Conclusion

32. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Berkhout, U.S. Pat. No. 5,142,586, teaches acoustic feedback reduction on stage (Col. 5, line 1 – Col. 6, line 15); and

Todter et al., U.S. Pat. No. 5,937,070, teaches a noise canceling system with a plurality of microphones and notch filters (Col 4, line 13 – Col. 5, line 25 and Fig. 7 and 11-13).

Ali, U.S. Pat. No. 6,381,272, teaches mutli-channel adaptive filtering, wherein filters share information for canceling echoes.

33. The applicant is reminded that Technology Center 2600 has undergone restructuring as of March 19, 2006. Any **further communication** regarding this application should **indicate the new Art Unit 2615** (old art unit 2644).

34. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel R. Sellers whose telephone number is 571-272-7528. The examiner can normally be reached on Monday to Friday, 9am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DRS

A handwritten signature in black ink, appearing to read 'SINH TRAN', with a long horizontal line extending to the right.

SINH TRAN
SUPERVISORY PATENT EXAMINER